Appendix I-C
Species List and Scoring of Tier I Species

A master species list was assembled that included terrestrial and aquatic plant and animal species known to occur in riverine and riparian habitats of the Columbia River between the vicinity of Priest Rapids Dam and the Columbia River estuary. The master list was developed by selecting species from databases and records maintained by federal and state resource management agencies associated with the Columbia River and its environs.

Species distributions and habitat preferences were also obtained from these agencies. The majority of information was obtained from the U.S. Fish and Wildlife Service national wildlife refuges. Information on species distributions and habitat preferences was used to exclude species that primarily use upland areas. From the resulting master species list, 368 species were identified as those that occur within the study area. Table C.1 provides the master species list. The table is a Word Perfect 5.1 for DOS file on diskette and provides the following information:

- class categories: algae, amphibians, aquatic invertebrates, birds, emergent vegetation, fish, macrophytes, mammals, reptiles, terrestrial invertebrates, and terrestrial vegetation
- common name
- scientific name
- general location to indicate whether the species occur within the study area (the riverine and riparian areas between the vicinity of Priest Rapids Dam and McNary Dam)
- habitat for each species: aquatic, benthic, buildings, coastal shoreline, cobble-gravel substrate, disturbed areas, estuarine, gravel substrate, island, marsh, riparian, sand-cobble substrata, sand-rock substrate, semi-aquatic, semi-pelagic, shoreline, upland, wetland
- specific location to indicate where data were available on the distribution of the species

Because of redundancy in exposure and the increased uncertainty in the risk assessments of the species for which data are lacking, the 368 study area species were reduced further in number. The Pacific Northwest National Laboratory formed a panel of regional biologists who developed a set of six criteria that were approved by the CRCIA Team for screening the study area species:

- commercial or recreational importance
- protection status under the Endangered Species Act or similar state legislation
- critical component of either the riparian or aquatic ecosystem: key predator or prey
- high potential exposure to contaminants
- availability of toxicological benchmarks for the species
- representative of a foraging guild

Each species received a positive or negative response to each of the six criteria. Three or more positive responses were selected as an arbitrary cutoff, resulting in selection of 93 (roughly 25 percent) of the 368 study area species. These 93 species were submitted to the CRCIA Team for review and input. An additional 88 species (based on their cultural and ecological importance) were provided by the CRCIA Team to create a list of 181 Tier I species. Table C.2 provides the list of 181 Tier I species. The table is a Word Perfect 5.1 for DOS file on diskette and provides the following information:

- identification of which species met which of the six criteria
- criteria scores for each species
- identification of which species were selected by the CRCIA Team for further evaluation

Of the 181 Tier I species, some were grouped based on similar life styles and trophic levels, resulting in 121 species. The CRCIA Team added 5 species to the 121 for a total of 126 species. The 126 species were scored (using the conceptual exposure model described in Section 4.1.2.2.1) for their potential exposure to contaminated media. Scores were scaled to reflect the general magnitude of a species potential exposure to contaminants in each medium, the duration of exposure, and acute radiation sensitivity. These scores represent an index for screening the relative exposure of species within taxonomic groups. These scores do not represent real differences in exposure. Species were scored specifically on the following:

- Exposure to biotic and abiotic media - ingestion of prey with separate scores assigned for biomagnifying and non-biomagnifying contaminants with individual contaminants not identified as biomagnifying or non-biomagnifying but rather only grouped generically as such; ingestion of sediment/soil, pore water/ groundwater, and surface water; dermal contact with sediment/soil, pore water/groundwater, and surface water; and inhalation of airborne contaminants. All media scores were scaled from 1 to 4 to ensure that all pathways/media were considered of equal importance in their contribution to an individual's overall exposure. In some pathway/media exposure scenarios, scores were scaled from 0 to 4 (see Sections 4.1.2.2.3-4.1.2.2.6) because these scenarios included the possibility of no exposure. The use of the zero, however, did not change the sum of the species' scores or the ultimate rankings. Sections 4.1.2.2.2-4.1.2.2.8 describe the basis and provide examples of the score assignments.

- Exposure duration - residence time in the study area. Exposure duration scores were scaled from 1 to 4. Section 4.1.2.2.9 describes the basis and provides examples of the score assignments.

- Acute radiation sensitivity - estimate using only the LD_{50} (dose that is lethal to 50 percent of test organisms) for radiation exposure (Whicker and Schultz 1982). Acute radiation sensitivity scores were also scaled from 1 to 4. Section 4.1.2.2.10 describes the basis and provides examples of the score assignments.

The scores and resulting ranks, which indicated the qualitative, relative exposure of species within taxonomic groups, are presented in Table C.3. The table is a Microsoft Excel 5.0 file on diskette. The scores and resulting ranks are described in detail in Section 4.1.2.2.11. The table contains the following information:

row 1 = summation of rows 3, 5, 6, and 7
row 2 = summation of rows 4, 5, 6, and 7
row 8 = summation of rows 9, 10, and 11
row 13 = summation of rows 1, 8, and 12
row 14 = summation of rows 2, 8, and 12
row 16 = multiplication of media weightings for in-river source areas from Table 4.14 with rows 3, 5, 6, 7, 9, 10, 11, and 12 followed by summation of these rows
row 17 = multiplication of media weightings for in-river source areas from Table 4.14 with rows 4, 5, 6, 7, 9, 10, 11, and 12 followed by summation of these rows
row 18 = rank based on score in row 16
row 19 = rank based on score in row 17
row 20 = multiplication of media weightings for outfall source areas from Table 4.14 with rows 3, 5, 6, 7, 9, 10, 11, and 12 followed by summation of these rows
row 21 = multiplication of media weightings for outfall source areas from Table 4.14 with rows 4, 5, 6, 7, 9, 10, 11, and 12 followed by summation of these rows
row 22 = rank based on score in row 20
row 23 = rank based on score in row 21
row 24 = average of rows 16 and 20
row 25 = average of rows 17 and 21
row 26 = rank based on score in row 24
row 27 = rank based on score in row 25
row 28 = maximum rank in rows 26 and 27
row 34 = highest number in rows 24 and 25 divided by 15, then added to scores in rows 30 and 32
row 35 = rank based on score in row 34